

1/35  
SEQUENCE LISTING

5 <110> Biotica Technology Limited  
 Pfizer Inc  
 Gaisser, Sabine

10 <120> Polyketides and their synthesis  
 <130> IP0013-WO01  
 <150> GB0327721.7  
 <151> 2003-11-28

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50 Leu Ser Ile Ser Tyr Ala Glu Gln Arg Glu Pro Arg Gly Ile Ala Glu  
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Thr Gly Thr Val Ala Arg Leu Asp Gly Cys Glu Leu Phe Gly Tyr Pro  
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Val Lys Asp Ala His Arg Tyr Gly Val Gly Glu Ile Asp Ser Gly Gly

2/35

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3/35

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4/35

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 <213> Streptomyces fradiae

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55 Arg Cys Ser Asn Asn Tyr Gly Pro Arg Gln Tyr Pro Glu Lys Ala Val  
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5/35

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55 Glu His Val Ala Gly His Pro Asp Leu Glu Phe Val Arg Gly Asp Ile  
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Ala Asp His Gly Trp Trp Arg Arg Leu Met Glu Gly Val Gly Leu Val  
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6/35

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7/35  
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8/35

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9/35

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10/35

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	ggcaacgccg	tacaggagct	gctggcgcg	cccgcgcagt	ggcgaggagct	cgtacgcgac	840
30	ccgcgcctcg	cggccgccgc	ggtgaccgaa	acgctgcgtg	tcgccccgcc	cgccgcctcg	900
	gagcgggcgg	tcgcccgcga	ggacacggac	atcgccgggc	agcgccctcc	cgcggggggg	960
35	agcgtcgtga	tcctcgtcgc	cgccgtcaac	cgcgcgcccg	tatccgcggg	aagcgacgcc	1020
	tccaccaccg	tcccgcacgc	cggcgggcgg	ccccgtacct	ccgccccctc	cgccccctca	1080
	gcccccttcg	acctcacacg	gcccgaggcc	gcgcccgggc	cgttcgggct	ccccggcgac	1140
40	ctgcacttcc	gcctcggcgg	gcccctggtc	ggaacggctc	ccgaagccgc	gctcgggtgc	1200
	ctggccgcac	ggctccccgg	tctgcgcgcc	gcggggcccg	ccgtgcggcg	ccgcgcctca	1260
45	ccggtgctgc	acggacacgc	ccgcctcccc	gtcgccgctc	cccggacggc	ccgtgacctg	1320
	cccgccaccg	caccgcggaa	ctgaggaggg	agtgccccga	tgcgtatcct	gctgaogtcg	1380
	ttcgcgca	acacgcacta	ctacaacctg	gtccccctcg	gctgggcgct	gcgcgcgcgc	1440
50	gggcacgacg	tacgggtcgc	cagccagccc	tcgctgaccg	gcaccatcac	cggctccggg	1500
	ctgaccgccg	tccccgtggg	cgacgacaog	gccatcgctc	agctgatcac	cgagatcggc	1560
55	gacgacctcg	tcctctacca	gcagggcacg	gacttcgtgg	acaccgcgga	cgagccgctg	1620
	tcctgggaac	acgccctcgg	acagcagacg	atcatgtcgg	ccatgtgctt	ctcgccgctg	1680
	aacggcgaca	gcaccatcga	cgacatgggtg	gcgctggccc	gttctctggaa	acgggacctc	1740
60	gtcctgtggg	agcccttcac	ctacgcggga	cccgtcgccg	cgcacgcctg	cggcgccgcc	1800

12/35

	cacgcccggc	tgctgtgggg	tcccgaactg	gtcctcaacg	cacggcggca	gttcacccgg	1860
	ctgctcgccg	agcgccccgt	cgaacagcgc	gaggacccgg	tcggcgaatg	gctcacgtgg	1920
5	acgctggagc	gccacggcct	cgccgcccgc	gcggaacaga	tcgaggaact	gttcgcccgg	1980
	cagtggacga	tcgaccccag	cgccgggagc	ctgcggctgc	cggtcgacgg	cgaggtcgtg	2040
10	cccatgcgct	tcgtgccgta	caacggcgcc	tcggtcgtcc	ccgcctggct	ctccgagccg	2100
	cctgcccggc	cccgggtctg	cgtaaccctc	ggcgtctcca	cccgggagac	ctacggcacg	2160
	gacggcgctc	cgttccacga	actgctggcc	ggactggccg	acgtggacgc	cgagatcgtc	2220
15	gccaccctcg	acgcggggca	gctcccggac	gccgcccgtc	tgcccggcaa	tgtgcgcgtc	2280
	gtcgacttcg	tgccgctgga	cgccctgctg	ccgagctgcg	ccgcgatcgt	ccaccacgga	2340
20	ggcgcgggaa	cctgtttcac	ggccaccgtg	cacggcgctc	cgagatcgt	cgtggcctcc	2400
	ctctgggacg	cgccgctgaa	ggcgacacaa	ctcgccgagg	cgggcgccgg	gacgcccctg	2460
	gaccccgggg	aactgggcgt	ggacaccctg	cgcggcgccg	tcgtgcgggt	gctggagagc	2520
25	cgcgagatgg	ccgtggcggc	ggctgcctc	gccgacgaga	tgctcgccgc	ccccaccccg	2580
	gccgcgctcg	tccccgcct	cgaacgcctc	accgccgcgc	accgccgcgc	ctgatcccgc	2640
30	caaggagccc	ccatgaacct	cgaatacagc	ggcgacatcg	cccggttgta	cgacctggtc	2700
	caccagggaa	agggcaagga	ctaccggggc	gaggccgagg	agctggccgc	gcttgtcacc	2760
	cagcgccgcc	ccggggcccg	ctccctcctc	gacgtggcct	gcggaacggg	gatgcacctg	2820
35	cggcacctcg	gcgacctctt	cgaggagggtg	gccgggggtg	agatgtcccc	cgacatgctg	2880
	gccatcgcg	agcgggcga	cccgagggcc	ggcatccacc	ggggggacat	gcgggacttc	2940
40	gccctcgggc	gccgcttcga	cgccgtgatc	tgcatgttca	gttccatcgg	gcacatgcgc	3000
	gaccagcggg	aactggacgc	ggcgatcggc	cggttcgccg	cgcacctgcc	gtccggcggg	3060
	gtcgtgatcg	tcgatccctg	gtggttcccc	gagacgttca	caccggggta	cgtcggcgcg	3120
45	agcctcgctg	aggccgagg	ccgcaccatc	gcgcgcttct	cccactccgc	gctcgaggac	3180
	ggcgcgaccc	ggatcgatgt	ggactacctc	gtcggcgctg	cgggggaggg	ggtgcggcac	3240
50	ttgaaggaga	cccatcggat	cacgcttttc	gggcgtgcgc	agtacgaggc	ggccttcacc	3300
	gcggcgggga	tgtccgtcga	gtacctcccg	cacgccgcca	ccgaccgcgg	actcttcgtc	3360
	ggcgctccagg	cctga					3375
55							
	<210>	8					
	<211>	295					
	<212>	PRT					
	<213>	Streptomyces eurythermus					
60	<400>	8					

13/35

Met Lys Gly Ile Ile Leu Ala Gly Gly Ser Gly Thr Arg Leu Arg Pro  
 1 5 10 15  
 5  
 Leu Thr Gly Ala Leu Ser Lys Gln Leu Leu Pro Val Tyr Asp Lys Pro  
 20 25 30  
 10  
 Met Ile Tyr Tyr Pro Leu Ser Val Leu Met Leu Ala Gly Ile Arg Asp  
 35 40 45  
 15  
 Ile Gln Ile Ile Thr Ser Lys Thr His Leu Glu Met Phe Arg Ser Leu  
 50 55 60  
 20  
 Leu Gly Asp Gly Ser Arg Ile Gly Ile Ser Val Gly Tyr Ala Glu Gln  
 65 70 75 80  
 25  
 Glu Glu Pro Arg Gly Ile Ala Glu Ala Phe Leu Ile Gly Glu Glu His  
 85 90 95  
 30  
 Ile Gly Asp Asp Pro Val Ala Leu Ile Leu Gly Asp Asn Val Phe His  
 100 105 110  
 35  
 Gly Pro Gly Phe Ser Ser Val Leu Ala Ser Thr Ala Ala Arg Leu Asp  
 115 120 125  
 40  
 Gly Cys Glu Leu Phe Gly Tyr Pro Val Lys Asp Pro Arg Arg Tyr Gly  
 130 135 140  
 45  
 Val Gly Glu Val Asp Ala Glu Gly Arg Leu Val Ser Leu Glu Glu Lys  
 145 150 155 160  
 50  
 Pro Glu Lys Pro Arg Ser His Leu Ala Val Thr Gly Leu Tyr Phe Tyr  
 165 170 175  
 55  
 Asp Asn Gly Val Val Asp Ile Ala Arg Arg Leu Thr Pro Ser Pro Arg  
 180 185 190  
 60  
 Gly Glu Leu Glu Ile Thr Asp Val Asn Lys Val Tyr Leu Glu Gln Gly  
 195 200 205  
 65  
 Arg Ala Arg Met Thr Glu Leu Gly Arg Gly Phe Ala Trp Leu Asp Met  
 210 215 220  
 70  
 Gly Thr His Ser Ser Leu Leu Gln Ala Gly Gln Tyr Val Gln Leu Leu  
 225 230 235 240

14/35

Glu Gln Arg Gln Gly Val Arg Ile Ser Cys Val Glu Glu Ile Ala Leu  
 245 250 255

5 Arg Met Gly Tyr Ile Ser Ala Arg Gln Cys His Glu Leu Gly Arg Glu  
 260 265 270

10 Leu Glu Ser Ser Ser Tyr Gly Arg Tyr Leu Met Asp Val Ala Glu Thr  
 275 280 285

15 Leu Met Ser Gly Pro Ala Ala  
 290 295

<210> 9  
 <211> 332  
 <212> PRT  
 20 <213> Streptomyces eurythermus  
 <400> 9

25 Met Arg Leu Leu Val Thr Gly Gly Ala Gly Phe Ile Gly Ser His Phe  
 1 5 10 15

30 Val Arg Gln Leu Leu Ala Gly Ala Tyr Pro Asp Leu Ala Gly Ala Arg  
 20 25 30

Thr Val Val Val Asp Lys Leu Thr Tyr Ala Gly Asn Leu Ala Asn Leu  
 35 35 40 45

40 Asp Pro Val Ala Asp His Pro Ser Leu Glu Phe Val His Ala Asp Ile  
 50 55 60

45 Arg Asp Ala Glu Val Met Ser Arg Val Val Arg Gly Ala Asp Val Val  
 65 70 75 80

Val His Phe Ala Ala Glu Ser His Val Asp Arg Ser Ile Ala Asp Ala  
 85 90 95

50 Ser Ala Phe Val Glu Thr Asn Val Arg Gly Thr Gln Val Leu Leu Gln  
 100 105 110

Ala Ala Val Glu Ala Gly Ala Gly Arg Phe Val His Val Ser Thr Asp  
 115 120 125

55 Glu Val Tyr Gly Ser Ile Ala Glu Gly Ser Trp Arg Glu Glu Gln Pro  
 130 135 140

60 Leu Ala Pro Asn Ser Pro Tyr Ala Ala Ser Lys Ala Ala Ser Asp Leu  
 145 150 155 160

15/35

5 Leu Ala Leu Ala Tyr His Arg Thr Tyr Gly Leu Pro Val Val Val Thr  
 165 170 175  
 Arg Cys Ser Asn Asn Tyr Gly Pro Tyr Gln His Pro Glu Lys Val Val  
 180 185 190  
 10 Pro Leu Phe Ala Thr Asn Leu Leu Asp Gly Leu Thr Val Pro Leu Tyr  
 195 200 205  
 15 Ser Asp Gly Gly Asn Ser Arg Asp Trp Leu His Val Asp Asp His Cys  
 210 215 220  
 20 Arg Gly Ile Ser Leu Val Ala Thr Arg Gly Arg Pro Gly Glu Val Tyr  
 225 230 235 240  
 25 His Ile Gly Gly Gly Thr Glu Leu Thr Asn Arg Glu Leu Thr Lys Arg  
 245 250 255  
 Leu Leu Gly Leu Cys Gly Ala Asp Ala Ser Ser Val Arg His Val Ala  
 260 265 270  
 30 Asp Arg Pro Gly His Asp Leu Arg Tyr Ala Leu Asp Ile Gly Lys Ile  
 275 280 285  
 35 Thr Gly Glu Leu Gly Tyr Ala Pro Arg Thr Asp Phe Thr Thr Gly Leu  
 290 295 300  
 40 Ala Asp Thr Val Arg Trp Tyr Ala Glu Asn Arg Ala Trp Trp Glu Pro  
 305 310 315 320  
 45 Leu Lys Lys Ala Ala Gln Glu Ala Arg Arg Thr Asp  
 325 330  
 <210> 10  
 <211> 787  
 <212> PRT  
 50 <213> Streptomyces eurythermus  
 <400> 10  
 55 Val Ser Thr Pro Ser Ala Pro Pro Val Pro Gly Ala Pro Ser Pro Ala  
 1 5 10 15  
 Gly His Pro Asp Glu Gly Leu Trp Val Arg Arg Tyr Arg Pro Val Arg  
 20 25 30  
 60

16/35

	Asp	Pro	Glu	Leu	Arg	Leu	Val	Cys	Phe	Pro	His	Ala	Gly	Gly	Ala	Ala	
			35					40					45				
5	Thr	Ser	Phe	Ala	Ala	Leu	Ala	Arg	Gly	Leu	Asp	Glu	Thr	Val	Glu	Ala	
		50					55					60					
10	Leu	Ala	Val	Gln	Tyr	Pro	Gly	Arg	Gln	Asp	Arg	Arg	His	Glu	Pro	Phe	
	65					70					75					80	
15	Ile	Pro	Ser	Ile	Ser	Gly	Leu	Val	Asp	Gln	Val	Val	Pro	Glu	Ile	Leu	
				85						90					95		
20	Arg	Trp	Ala	Asp	Arg	Pro	Leu	Ala	Leu	Phe	Gly	His	Ser	Met	Gly	Ala	
				100					105					110			
25	Thr	Val	Ala	Phe	Glu	Val	Ala	Arg	Arg	Leu	Arg	Gly	Ser	Gly	Gln	Ala	
			115					120					125				
30	Ser	Pro	Val	His	Leu	Leu	Val	Ser	Gly	Arg	Arg	Ala	Pro	Thr	Val	Arg	
		130					135					140					
35	Arg	Arg	Asp	Val	Ala	His	Leu	Leu	Asp	Asp	Asp	Ala	Leu	Ile	Ala	Glu	
	145					150					155					160	
40	Ile	Ala	Thr	Leu	Gln	Gly	Thr	Glu	Asp	Ala	Val	Leu	Gln	Asp	Glu	Glu	
				165						170					175		
45	Leu	Leu	Arg	Leu	Ala	Leu	Pro	Ala	Ile	Arg	Asn	Asp	Tyr	Arg	Ala	Ala	
			180						185					190			
50	Gly	Thr	Tyr	Ala	Tyr	Val	Pro	Gly	Gly	Ala	Leu	Asp	Cys	Pro	Val	Thr	
			195					200					205				
55	Val	Leu	Thr	Gly	Asp	Arg	Asp	Pro	Asp	Val	Pro	Leu	Glu	Glu	Ala	Arg	
		210					215					220					
60	Ala	Trp	Arg	Glu	Leu	Thr	Thr	Gly	Pro	Phe	Ala	Leu	His	Thr	Phe	Ala	
	225					230					235					240	
65	Gly	Gly	His	Phe	Tyr	Leu	Asn	Asp	Arg	Met	Asp	Glu	Val	Cys	Arg	Thr	
				245						250					255		
70	Ile	Gly	Asp	Ala	Leu	Ala	Gly	Thr	Ala	Thr	Ala	Asp	Thr	Ala	Thr	Gly	
			260						265					270			
75	Thr	Val	Pro	Pro	Arg	Thr	Ala	Ala	Asp	Thr	Ser	Thr	Gly	Pro	Val	Pro	



17/35

275

280

285

5 Pro Arg Thr Ala Ala Asp Thr Ala Arg Glu Pro Val Pro Pro Arg Ser  
 290 295 300

10 Ala Pro Ala Pro His Gly Ala Ala Arg Arg Arg Ala Asp Ala Val Arg  
 305 310 315 320

15 Pro Gly Asp Pro Val Asp Thr Ala Arg Arg Val Leu Val Ser Ala Arg  
 325 330 335

20 Thr Ala Asp Ser Ala Val Thr Pro Phe Asp Gly Ile Ser Gly Trp Leu  
 340 345 350

25 Ala Glu Arg Leu Arg Ala Gly Arg Phe Asp Val Ser Arg Val Pro Phe  
 355 360 365

30 Ala Glu Leu Arg Gly Trp Ser Phe His Pro Gly Thr Gly Asn Leu His  
 370 375 380

35 His Ala Ser Gly Arg Phe Phe Ser Val Glu Gly Leu His Val Arg Thr  
 385 390 395 400

40 Asp Arg Leu Pro Glu Arg Gly Trp Thr Gln Pro Ile Ile Val Gln Pro  
 405 410 415

45 Glu Val Gly Leu Leu Gly Ile Val Ala Arg Glu Ile Asp Gly Val Leu  
 420 425 430

50 His Phe Leu Met Gln Ala Lys Met Glu Pro Gly Asn Val Asn Val Leu  
 435 440 445

55 Gln Val Ser Pro Thr Val Gln Ala Thr Arg Ser Asn Phe Thr Gly Val  
 450 455 460

60 His Arg Gly Arg Asp Ile Arg Tyr Leu Asp Leu Phe Met Gly Pro Arg  
 465 470 475 480

Arg Ala Arg Val Leu Val Asp Ser Ile Gln Ser Glu Gln Ala Asp Trp  
 485 490 495

65 Phe Leu Ala Lys Arg Asn Arg Asn Met Ile Val Glu Leu Ala Ala Asp  
 500 505 510

70 Asp Asp Leu Asp Ile Gly Glu Asp Phe Arg Trp Leu Thr Leu Gly Gln  
 515 520 525

18/35

5	Leu 530	Arg	Arg	Leu	Leu	Met	Leu 535	Asp	Asn	Val	Val	Asn 540	Met	Asp	Ala	Arg
10	Ser 545	Ile	Leu	Ala	Cys	Leu 550	Pro	Thr	Ala	Asp	Ala 555	Asp	Ala	Ser	Ala	Pro 560
15	Ser	Pro	Val	Leu	Arg 565	Ser	Phe	Phe	Gly	Ser 570	Pro	Gly	Ala	Ala	Arg 575	His
20	Thr	Thr	Ala	Glu 580	Val	Leu	Thr	Trp	Phe 585	Thr	Gly	Val	Arg	Ala 590	Leu	Arg
25	Glu	Leu	Val 595	Gln	Asn	Arg	Val	Pro 600	Leu	Asp	Thr	Val	Thr 605	Ala	Asp	Gly
30	Trp	Tyr 610	Arg	Thr	Pro	His	Glu 615	Ile	Ala	His	Glu	Ser 620	Gly	Arg	His	Phe
35	Arg 625	Val	Met	Ala	Ala	Glu 630	Val	Ser	Ala	Ser	Ser 635	Arg	Glu	Val	Thr	Ser 640
40	Trp	Thr	Gln	Pro	Leu 645	Ile	Glu	Pro	Arg	Leu 650	Pro	Gly	Leu	Met	Ala 655	Leu
45	Leu	Val	Lys	Ser 660	Val	Asp	Gly	Val	Leu 665	His	Ala	Leu	Val	Arg 670	Ala	Arg
50	Val	Asp	Val 675	Gly	His	Leu	Asn	Val 680	Ala	Glu	Leu	Ala	Pro 685	Thr	Val	Gln
55	Cys	Arg 690	Pro	Gln	Glu	His	Thr 695	Gly	Pro	Arg	Gly	Leu 700	Pro	Gly	Pro	Pro
60	Tyr 705	Leu	Glu	Asp	Val	Leu 710	Ser	Ala	Pro	Pro	Gln 715	Asp	Val	Arg	Tyr	Asp 720
65	Ala	Val	Gln	Ser	Glu 725	Glu	Gly	Gly	Arg	Phe 730	Phe	His	Ala	Gln	Asn 735	Arg
70	Tyr	Val	Ile	Val 740	Glu	Val	Pro	His	Asp 745	Phe	Pro	Glu	Asp	Ala 750	Pro	Asp
75	Asp	Phe	Ala 755	Trp	Leu	Ser	Leu	Gly 760	Gln	Leu	Thr	Gly	Leu 765	Leu	Ala	His

19/35

Gly Asn Tyr Leu Asn Ile Glu Leu Arg Thr Leu Val Ala Cys Ala His  
 770 775 780

5

Thr Leu Tyr  
785

10

<210> 11  
 <211> 333  
 <212> PRT  
 <213> Streptomyces eurythermus

15

<400> 11

Met Val Asn Asp Pro Met Pro Arg Gly Ser Gly Ser Gly Ser Val Val  
1 5 10 15

20

Val Leu Gly Gly Ala Gly Tyr Val Gly Arg His Val Cys Ala Ala Phe  
20 25 30

25

Ala Ala Arg Gly Arg Asp Val Val Val Val Gly Arg Arg Pro Pro Glu  
35 40 45

30

Glu Pro Met Pro Tyr Arg Cys Val Thr Leu Asp Leu Ala Gly Thr Asp  
50 55 60

35

Pro Ala Ala Leu Ala Ala Ala Leu Asp Ala Glu Arg Pro Asp Thr Ile  
65 70 75 80

Val Asn Ser Val Gly Ser Ile Trp Gly Arg Thr Asp Glu Gln Met Trp  
85 90 95

40

Ser Ala Thr Ala Val Pro Thr Leu Arg Leu Leu Glu Ala Leu Ala Leu  
100 105 110

45

Met Ser Ala Arg Pro Arg Leu Val His Leu Gly Ser Val Leu Glu Tyr  
115 120 125

50

Gly Pro Val Thr Pro Gly Gly Ser Val Gly Ala Asp Ala Val Pro Arg  
130 135 140

55

Pro Asp Thr Ala Tyr Gly Arg Ser Lys Leu Ala Ala Ser Glu Ala Val  
145 150 155 160

Leu Arg Gly Thr Ser Gly Gly Trp Val Asp Gly Val Val Leu Arg Val  
165 170 175

60

Ser Asn Val Ser Gly Pro Gly Thr Pro Arg Ile Ser Leu Leu Gly Gln

20/35

180

185

190

5 Val Ala Glu Arg Leu Leu Ala Ala Ala Gly Thr Gly Ala Glu Ala Val  
 195 200 205

10 Val Glu Leu Ser Arg Leu Arg Ala His Arg Asp Tyr Val Asp Val Arg  
 210 215 220

15 Asp Val Ala Asp Ala Val Val Ala Ala Ala Arg Ala Pro Ala Val Pro  
 225 230 235 240

Val Ala Val Gly Ile Gly Arg Gly Glu Ala Val Ala Val Arg Asp Leu  
 245 250 255

20 Val Gly Leu Phe Ile Glu Ala Ser Gly Ile Pro Ala Arg Val Val Glu  
 260 265 270

25 Arg Pro Ala Pro Gly Arg Ala Pro Gly His Arg Glu Asp Trp Leu Arg  
 275 280 285

30 Val Asp Thr Gly Ala Ala Arg Ala Leu Leu Gly Trp Ala Pro Arg Arg  
 290 295 300

Ser Leu Arg Glu Ser Val Arg Asp Cys Trp His Asp Leu Val Arg Ala  
 305 310 315 320

35 His Arg Leu Pro Thr Thr Pro Ser Lys His Ser Gly Gly  
 325 330

40 <210> 12  
 <211> 373  
 <212> PRT  
 <213> Streptomyces eurythermus

45 <400> 12

Val Thr Thr Tyr Val Trp Asp Tyr Leu Ala Glu Tyr Gln Asn Glu Arg  
 1 5 10 15

50 Ala Asp Leu Leu Asp Ala Val Glu Thr Val Phe Ala Ser Gly Gln Leu  
 20 25 30

55 Val Leu Gly Pro Ser Val Asp Gly Phe Glu Lys Glu Phe Ala Asp Tyr  
 35 40 45

60 His Gly Leu Arg His Cys Gly Gly Val Asp Asn Gly Thr Asn Ala Val  
 50 55 60

21/35

Lys Leu Gly Leu Gln Ala Leu Gly Val Gly Pro Gly Asp Glu Val Val  
 65 70 75 80  
 5 Thr Val Ser Asn Thr Ala Ala Pro Thr Val Val Ala Ile Asp Gly Thr  
 85 90 95  
 10 Gly Ala Thr Pro Val Phe Val Asp Val Arg Ala Glu Asp His Leu Met  
 100 105 110  
 15 Asp Thr Asp Gln Val Ala Asp Val Ile Thr Pro Arg Thr Lys Ala Leu  
 115 120 125  
 20 Leu Pro Val His Leu Tyr Gly Gln Cys Val Asp Met Ala Pro Leu Arg  
 130 135 140  
 Ala Leu Ala Glu Gln His Gly Leu Val Val Leu Glu Asp Cys Ala Gln  
 145 150 155 160  
 25 Ala His Gly Ala Arg His His Gly Glu Leu Ala Gly Thr Leu Gly Asp  
 165 170 175  
 30 Ala Ala Ala Phe Ser Phe Tyr Pro Thr Lys Val Leu Gly Ala Tyr Gly  
 180 185 190  
 35 Asp Gly Gly Ala Val Leu Thr Asp Asp Ala Asp Val Asp Arg Ala Leu  
 195 200 205  
 40 Arg Arg Leu Arg Tyr Tyr Gly Met Glu Asp Val Tyr Tyr Val Val Gln  
 210 215 220  
 Thr Pro Gly His Asn Ser Arg Leu Asp Glu Val Gln Ala Glu Ile Leu  
 225 230 235 240  
 45 Arg Arg Lys Leu Thr Arg Leu Asp Arg Tyr Ile Glu Gly Arg Arg Ala  
 245 250 255  
 50 Val Ala Arg Arg Tyr Ala Glu Gly Leu Ala Asn Leu Thr Gly Pro Gly  
 260 265 270  
 55 Gly Leu Val Leu Pro Ser Val Thr Glu Gly Asn Asp His Val Tyr Tyr  
 275 280 285  
 60 Val Tyr Val Val Arg His Pro Arg Arg Asp Asp Ile Ile Glu Ala Leu  
 290 295 300

22/35

Lys Ser Tyr Gly Ile Ser Leu Asn Ile Ser Tyr Pro Trp Pro Val His  
 305 310 315 320

5 Thr Met Thr Gly Phe Ala His Leu Gly Tyr Ala Lys Gly Ser Leu Pro  
 325 330 335

10 Val Thr Glu Arg Leu Ala Asp Glu Ile Phe Ser Leu Pro Met Tyr Pro  
 340 345 350

15 Gly Leu Ala Pro Asp Val Gln Asp Lys Val Ile Ala Ala Leu His Glu  
 355 360 365

Val Leu Ala Thr Leu  
 370

20 <210> 13  
 <211> 447  
 <212> PRT  
 <213> Streptomyces eurythermus

25 <400> 13

30 Val Ser Pro Ala Pro Ala Thr Glu Asp Pro Ala Ala Ala Gly Arg Arg  
 1 5 10 15

Leu Gln Leu Thr Arg Ala Ala Gln Trp Phe Ala Gly Thr Gln Asp Asp  
 20 25 30

35 Pro Tyr Ala Leu Val Leu Arg Ala Glu Ala Thr Asp Pro Ala Pro Tyr  
 35 40 45

40 Glu Glu Arg Ile Arg Ala His Gly Pro Leu Phe Arg Ser Asp Leu Leu  
 50 55 60

45 Asp Thr Trp Val Thr Ala Ser Arg Ala Val Ala Asp Glu Val Ile Thr  
 65 70 75 80

50 Ser Pro Ala Phe Asp Gly Leu Thr Ala Asp Gly Arg Arg Pro Gly Ala  
 85 90 95

Arg Glu Leu Pro Leu Ser Gly Thr Ala Leu Asp Ala Asp Arg Ala Thr  
 100 105 110

55 Cys Ala Arg Phe Gly Ala Leu Thr Ala Trp Gly Gly Pro Leu Leu Pro  
 115 120 125

60 Ala Pro His Glu Arg Ala Leu Arg Glu Ser Ala Glu Arg Arg Ala His  
 130 135 140

23/35

5 Thr Leu Leu Asp Gly Ala Glu Ala Ala Leu Ala Ala Asp Gly Thr Val  
 145 150 155 160  
 Asp Leu Val Asp Ala Tyr Ala Arg Arg Leu Pro Ala Leu Val Leu Arg  
 165 170 175  
 10 Glu Gln Leu Gly Val Pro Glu Glu Ala Ala Thr Ala Phe Glu Asp Ala  
 180 185 190  
 15 Leu Ala Gly Cys Arg Arg Thr Leu Asp Gly Ala Leu Cys Pro Gln Leu  
 195 200 205  
 20 Leu Pro Asp Ala Val Ala Gly Val Arg Ala Glu Ala Ala Leu Thr Ala  
 210 215 220  
 25 Val Leu Ala Ser Ala Leu Arg Gly Thr Pro Ala Gly Arg Ala Pro Asp  
 225 230 235 240  
 Ala Val Ala Ala Ala Arg Thr Leu Ala Val Ala Ala Ala Glu Pro Ala  
 245 250 255  
 30 Ala Thr Leu Val Gly Asn Ala Val Gln Glu Leu Leu Ala Arg Pro Ala  
 260 265 270  
 35 Gln Trp Ala Glu Leu Val Arg Asp Pro Arg Leu Ala Ala Ala Ala Val  
 275 280 285  
 40 Thr Glu Thr Leu Arg Val Ala Pro Pro Val Arg Leu Glu Arg Arg Val  
 290 295 300  
 45 Ala Arg Glu Asp Thr Asp Ile Ala Gly Gln Arg Leu Pro Ala Gly Gly  
 305 310 315 320  
 Ser Val Val Ile Leu Val Ala Ala Val Asn Arg Ala Pro Val Ser Ala  
 325 330 335  
 50 Gly Ser Asp Ala Ser Thr Thr Val Pro His Ala Gly Gly Arg Pro Arg  
 340 345 350  
 55 Thr Ser Ala Pro Ser Val Pro Ser Ala Pro Phe Asp Leu Thr Arg Pro  
 355 360 365  
 60 Val Ala Ala Pro Gly Pro Phe Gly Leu Pro Gly Asp Leu His Phe Arg  
 370 375 380

24/35

5 Leu Gly Gly Pro Leu Val Gly Thr Val Ala Glu Ala Ala Leu Gly Ala  
 385 390 395 400  
 Leu Ala Ala Arg Leu Pro Gly Leu Arg Ala Ala Gly Pro Ala Val Arg  
 405 410 415  
 10 Arg Arg Arg Ser Pro Val Leu His Gly His Ala Arg Leu Pro Val Ala  
 420 425 430  
 15 Val Ala Arg Thr Ala Arg Asp Leu Pro Ala Thr Ala Pro Arg Asn  
 435 440 445  
 20 <210> 14  
 <211> 424  
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 <213> Streptomyces eurythermus  
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 25 Met Arg Ile Leu Leu Thr Ser Phe Ala His Asn Thr His Tyr Tyr Asn  
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 30 Leu Val Pro Leu Gly Trp Ala Leu Arg Ala Ala Gly His Asp Val Arg  
 20 25 30  
 35 Val Ala Ser Gln Pro Ser Leu Thr Gly Thr Ile Thr Gly Ser Gly Leu  
 35 40 45  
 Thr Ala Val Pro Val Gly Asp Asp Thr Ala Ile Val Glu Leu Ile Thr  
 50 55 60  
 40 Glu Ile Gly Asp Asp Leu Val Leu Tyr Gln Gln Gly Met Asp Phe Val  
 65 70 75 80  
 45 Asp Thr Arg Asp Glu Pro Leu Ser Trp Glu His Ala Leu Gly Gln Gln  
 85 90 95  
 50 Thr Ile Met Ser Ala Met Cys Phe Ser Pro Leu Asn Gly Asp Ser Thr  
 100 105 110  
 55 Ile Asp Asp Met Val Ala Leu Ala Arg Ser Trp Lys Pro Asp Leu Val  
 115 120 125  
 60 Leu Trp Glu Pro Phe Thr Tyr Ala Gly Pro Val Ala Ala His Ala Cys  
 130 135 140  
 Gly Ala Ala His Ala Arg Leu Leu Trp Gly Pro Asp Val Val Leu Asn



25/35

	145		150		155		160
5	Ala Arg Arg Gln Phe Thr Arg Leu Leu Ala Glu Arg Pro Val Glu Gln	165		170		175	
10	Arg Glu Asp Pro Val Gly Glu Trp Leu Thr Trp Thr Leu Glu Arg His	180		185		190	
15	Gly Leu Ala Ala Asp Ala Asp Thr Ile Glu Glu Leu Phe Ala Gly Gln	195		200		205	
20	Trp Thr Ile Asp Pro Ser Ala Gly Ser Leu Arg Leu Pro Val Asp Gly	210		215		220	
25	Glu Val Val Pro Met Arg Phe Val Pro Tyr Asn Gly Ala Ser Val Val	225		230		235	240
30	Pro Ala Trp Leu Ser Glu Pro Pro Ala Arg Pro Arg Val Cys Val Thr	245		250		255	
35	Leu Gly Val Ser Thr Arg Glu Thr Tyr Gly Thr Asp Gly Val Pro Phe	260		265		270	
40	His Glu Leu Leu Ala Gly Leu Ala Asp Val Asp Ala Glu Ile Val Ala	275		280		285	
45	Thr Leu Asp Ala Gly Gln Leu Pro Asp Ala Ala Gly Leu Pro Gly Asn	290		295		300	
50	Val Arg Val Val Asp Phe Val Pro Leu Asp Ala Leu Leu Pro Ser Cys	305		310		315	320
55	Ala Ala Ile Val His His Gly Gly Ala Gly Thr Cys Phe Thr Ala Thr	325		330		335	
60	Val His Gly Val Pro Gln Ile Val Val Ala Ser Leu Trp Asp Ala Pro	340		345		350	
65	Leu Lys Ala His Gln Leu Ala Glu Ala Gly Ala Gly Ile Ala Leu Asp	355		360		365	
70	Pro Gly Glu Leu Gly Val Asp Thr Leu Arg Gly Ala Val Val Arg Val	370		375		380	
75	Leu Glu Ser Arg Glu Met Ala Val Ala Ala Arg Arg Leu Ala Asp Glu	385		390		395	400

26/35

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 35 40 45  
 30 Ala Cys Gly Thr Gly Met His Leu Arg His Leu Gly Asp Leu Phe Glu  
 50 55 60  
 35 Glu Val Ala Gly Val Glu Met Ser Pro Asp Met Leu Ala Ile Ala Gln  
 65 70 75 80  
 Arg Arg Asn Pro Glu Ala Gly Ile His Arg Gly Asp Met Arg Asp Phe  
 85 90 95  
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 100 105 110  
 45 Gly His Met Arg Asp Gln Arg Glu Leu Asp Ala Ala Ile Gly Arg Phe  
 115 120 125  
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 130 135 140  
 55 Phe Pro Glu Thr Phe Thr Pro Gly Tyr Val Gly Ala Ser Leu Val Glu  
 145 150 155 160  
 Ala Glu Gly Arg Thr Ile Ala Arg Phe Ser His Ser Ala Leu Glu Asp  
 165 170 175  
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27/35

	Gly	Ala	Thr	Arg	Ile	Asp	Val	Asp	Tyr	Leu	Val	Gly	Val	Pro	Gly	Glu	
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			195					200					205				
10	Ala	Gln	Tyr	Glu	Ala	Ala	Phe	Thr	Ala	Ala	Gly	Met	Ser	Val	Glu	Tyr	
		210					215					220					
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28/35

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29/35

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32/35

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34/35

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35/35

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